

built, less convex above, with narrower interorbital space, narrower brain-case, and longer, less open palatal foramina. Palate slightly broader, the two molar series less strictly parallel, more divergent behind.

Dimensions of the type (measured on a skin):—

Head and body 145 mm.; tail imperfect (in another similar-sized specimen 190); hind foot 31.

Skull: greatest length 39.5; condylo-basal length 37.8; zygomatic breadth 21; nasals 13; interorbital breadth 6.2; palatilar length 18.4; palatal foramina 6.3; breadth across outside m^2 8.8; upper molar series 7.3.

Hab. Talaud Islands, between Gilolo and Mindanao. Type from Liroeng.

Type. Adult female. B.M. no. 21. 2. 9. 3. Temporary, number 24. Taken by the Controleur 13th April, 1916. Presented by the Buitenzorg Museum.

By the discovery of this distinct species the known range of the genus is considerably extended north-westwards.

XXXIII.—Notes on the East Asiatic Members of the Species *Sciurus vulgaris*, Linn., with Descriptions of Two new Sub-species. By ARTHUR DE C. SOWERBY, F.Z.S., F.R.G.S.

WHILE on a summer excursion into the biologically little-known district in North-eastern Chihli, China, known as the Tung Ling, or Eastern Tombs, I secured four specimens of a peculiarly dark squirrel belonging to the *Sciurus vulgaris* group. Two of these specimens were intended for the Smithsonian Institution, the other two being retained in my own collection in case of accidents. Only one of the skins and the two skulls of the first pair were received in Washington, and these have recently been re-examined by me and compared with specimens of various other subspecies of *S. vulgaris* in the British Museum Collection, a proceeding that has only been possible through the extreme courtesy of the authorities in the two Museums concerned. I find that the Tung Ling specimens represent a new and distinct form, easily separable from *S. v. rupestris*, Thos., of Saghalin Island, which it most nearly resembles, by its superior size and certain colour-differences. This form I propose to name *Sciurus vulgaris chiliensis*.

In the course of making my examination I find that the Corean member of this group of squirrels has not up to the *Ann. & Mag. N. Hist.* Ser. 9. Vol. vii. 17

present been described. It is like the Yezo form, *S. v. orientis*, Thos., but is separable from it as a subspecies by reason of its broader skull and less rufous pelages, both summer and winter. To this form may be given the name *Sciurus vulgaris coreæ*.

The already known East Asiatic forms are :—

1. *Sciurus vulgaris colatus* (Hodgson), of the Altai and Siberia.
2. *Sciurus vulgaris mantchuricus*, Thos., of the Khingan Mountains and North and Central Manchuria, the Amur, and the Ussuri regions.
3. *Sciurus vulgaris rupestris*, Thos., of Saghalin Island.
4. *Sciurus vulgaris orientis*, Thos., of Yezo Island.

It is now possible, owing to the good series of specimens in the British Museum, to determine with some degree of accuracy the distribution of these forms, and, in order to make the subject clear, brief descriptions of those already known are given here in addition to the full descriptions of the two new subspecies.

1. *Sciurus vulgaris colatus* (Hodgson).

Mustela colatus, Hodgson, Calc. Journ. Nat. Hist. vol. ii. p. 221 (1842).
Sciurus vulgaris colatus (Hodg.), Thomas, Proc. Zool. Soc. Lond. (1905), pp. 346-7 (1906).

“Typical locality the high regions of Central Asia” (Thomas). This represents Pallas’s *Sciurus varius*, but since, as Mr. Thomas has pointed out in the above-cited paper, that name had already been used by Kerr, Hodgson’s *colatus* is the correct one. Of it Mr. Thomas says :—

“Clear deep grey in winter without rufous suffusions.” It is more rufous in its summer pelage than *S. v. orientis*, *S. v. coreæ*, and *S. v. rupestris*, and very much more rufous than *S. v. mantchuricus*. In winter it is lighter than *mantchuricus*, darker than *orientis*, less brownish than *coreæ*; while its legs and feet are less black, more brownish than either *orientis* or *coreæ*.

A specimen from west of Lake Baikal measures :—Head and body 225 mm.; tail 170; hind foot 58; ear 35.

Skull: greatest length 55; basilar length 42·2; true molar series 7.

Range. The Thian Shan and Altai Mountains, Southern Siberia, and probably Siberia north of the Amur basin.

2. *Sciurus vulgaris mantchuricus*, Thomas.

Ann. & Mag. Nat. Hist. ser. 8, vol. iv. p. 501 (Dec. 1909).

Type-locality. The Khingan Mountains, N. Manchuria.

Of this subspecies Mr. Thomas says:—

“The Khingan squirrel is readily distinguishable from its nearest allies, *S. v. colatus*, the Altai form, *rupestris* of Saghalin, and *orientis* of Hokkaido and Korea, by its markedly larger size, as indicated by its skull. In colour also it is of a much darker grey than any of them.”

The Khingan specimens in the British Museum are all large, and of a dark grey, almost blackish-grey colour, and are in part winter part summer pelage. They show very long hair, considerably longer than in winter specimens of any other of the East Asiatic forms. A specimen collected by me in the West Kirin forest, near Chao-yang Chen, Manchuria, in June, shows the same large size (length of head and body 240, tail 210 mm.) and long hair, but is of a slightly lighter grey, also without any rufous. A number of specimens taken by me in the I-mien-po district of North Kirin in autumn and early winter showed the pelages ranging from dark grey to grey with a slight brownish washing on the backs. Even in these there was no rufous colour in evidence.

Measurements of type (B.M. no. 10. 5. 1. 8), a fully-adult female:—

Head and body 250 mm.; tail 205; hind foot 61; ear 30.

Skull: greatest length 57; basilar length 43; length of true molar series 7.2.

Range. The Amur, Sungari, and Ussuri basins, in the Amur and Primorsk provinces of East Siberia, and Chinese Manchuria excluding the Yalu basin.

3. *Sciurus vulgaris rupestris*, Thomas.

Proc. Zool. Soc. Lond. 1907 (April), pp. 410–411.

Type-locality. Dariné, 25 miles north-west of Korsakoff, Saghatin Island.

In this form melanism is predominant. It is smaller than *orientis*, and much less rufous in both summer and winter. Frequently in summer the pelages are entirely black on the upper parts, legs, and tail, the belly, chest, throat, and even chin being pure white; while in those specimens in which there is rufous colouring it is either fairly universally distributed or occurs only on the back and about the ears. In black specimens there is no sign of rufous on the legs and flanks, as there is in *chiliensis*. In winter-skins the colour is greyer with no rufous on the back, only a little about the ears.

This form is the smallest of the subspecies found in these regions.

Measurements of (1) type (B.M. no. 7. 2. 5. 26), a slightly

immature male:—Head and body 190 mm., tail 174, hind foot 55, ear 32; (2) an adult male:—Head and body 208 mm., tail 178, hind foot 57, ear 32.

Skulls: (1) greatest length 48·8, basilar length 37, length of true molar series 7; (2) greatest length 50·7, basilar length 39·5.

Range. Saghalin Island.

4. *Sciurus vulgaris orientis*, Thomas.

Proc. Zool. Soc. Lond. (1905), vol. ii. 1906, pp. 345-347.

Type-locality. Aoyama, Hokkaido (Yezo), Japan.

Of this form Mr. Thomas says of its winter pelage:—“The whole of the Hokkaido examples are strongly suffused along the head, dorsal area, and base of tail with a colour between ‘mars-brown’ and ‘vinaceous-cinnamon’ of Ridgeway, though paler than either. Sides clearer and more silvery grey, especially on two patches on each side, behind the shoulders and in front of the hips. Throat, chest, and belly pure sharply-defined white, the hairs white to their roots. Ear-tufts, hands, and feet blackish, more or less speckled with fulvous. Tail broadly washed with black, the basal part of the hairs more or less greyish fulvous.

“In summer pelage the ground colour (apart from melanism) is dull reddish brown, with dark red ears and feet, and perhaps sometimes a more or less red-washed tail.”

It is rather a large form, coming next to *mantchuricus* in size. It is easily distinguishable from *rupestris* on this account, as well as by its lighter, more rufous or brownish winter coat, and less inclination towards melanism in summer pelage.

Measurements of type (B.M. no. 6.1.4.128), an adult male:—

Head and body 244 mm.; tail 175; hind foot 60; ear 34.

Skull: greatest length 54; basilar length 43; length of true molar series 7.

Range. Yezo Island, N. Japan.

5. *Sciurus vulgaris coreæ*, sp. n.

Sciurus vulgaris, Linn., Thomas, Proc. Zool. Soc. Lond. 1907, p. 464.

The specimens on which this new subspecies is based are in the British Museum Collection, two having been taken in the type-locality in November, 1906, by the late Mr. M. P. Anderson, and two by Mr. C. W. Campbell in January, 1889, at Seoul. A fifth specimen in the collection which must be referred to this form was taken by Sir H. E. M. James in South Manchuria (probably in the Yalu basin) in June, 1886.

This form may be described as intermediate in colouring, but not in size, between the Yezo *orientis* and the Khingan and Manchurian *mantchuricus*. It is almost without any rufous colouring, either in winter or summer pelage, in which it agrees with *mantchuricus*, but is not so purely greyish, being more brownish, in which it agrees more with *orientis*. It is smaller than either of these two forms, and has a proportionately shorter and wider skull.

Colour.—Winter pelage very close to *orientis*, but darker, the lightest specimens of *orientis* being considerably lighter than the lightest of *coreæ*, while there is much less tendency to rufous in *coreæ*. Very distinct from *chiliensis*, *rupestris*, and *mantchuricus*; somewhat approaching *colatus*, but browner. Its general colour may be described as brownish grey, the feet and the long hairs of the ears and tail being blackish, more so than in *orientis*. The feet are lightly washed with rufous in some specimens. Judging from the South Manchurian specimen, which is certainly not *mantchuricus*, the summer pelage is of a general, and more or less uniform, dark brown, with no rufous washing.

Measurements of type:—

Head and body 225 mm.; tail 182; hind foot 63; ear 32.

Skull: greatest length 52; basilar length 39.5; length of true molar series 7.

Habitat. Kalognai, 55 miles N.E. of Seoul, Corea.

Type. A fully-adult female. B.M. no. 7. 6. 3. 17. Orig. No. 1151. Collected by M. P. Anderson and H. Orié on 26 Nov., 1906. Alt. 500 feet.

Range. Forested parts of Corea into the Yalu basin of South Manchuria, meeting that of *mantchuricus* on the Yalu-Sungari divide in the Cháng Pei Shan.

6. *Sciurus vulgaris chiliensis*, sp. n.

This is a dark form, not truly melanistic as appears to be the case in the dark specimens of *rupestris*, with which it agrees most in appearance, and is characterized by its black or blackish-brown summer pelage, in which the legs, feet, lips, and flanks are rufous, the region of the face, muzzle, and chin inclined to greyish, with no rufous about the ears. It differs from *rupestris* in this last characteristic and in being distinctly larger throughout. From *mantchuricus*, its nearest mainland neighbour, it differs in being blacker in summer and in the presence of the rufous colouring, as well as in its smaller size. From the other species it is easily distinguishable by its darker summer pelage and dark grey winter coat.

The skull is larger and proportionately longer than in *rupestris*, smaller than in *mantchuricus*, stouter and broader in the region of the nasals than in *colatus*.

Colour.—In summer the upper parts, including the tail, black or brownish black; chin, muzzle, and face greyish; lips, legs, feet, and flanks rufous; belly, chest, throat, and inner surface of fore legs white. Of the four specimens secured all showed this colouring, in one the upper parts being pure black and the rufous of the flanks and legs very bright. It may thus be argued that the black colouring in this form is a fixed character, and not recurring melanism, as in the Saghalin *rupestris*, in which there are sometimes red summer individuals, many pure black ones with only a little rufous about the ears, and a large number of individuals that are intermediate in colour. All specimens taken in the Tung Ling that I have heard of have been described as black. The winter pelage, judging from skins seen in Peking, appears to be pure dark grey.

Measurements of type:—

Head and body 235 mm.; tail 200; hind foot 62; ear 32.

Skull: greatest length 55; basilar length 42.5; length of true molar series 7.

Habitat. Wu-ling-shan, in the Tung Ling area, 75 miles N.E. of Peking, Chihli, N. China.

Type. A fully-adult female. U.S. Nat. Mus. no. 219185. Orig. no. 1033. Collected by A. de C. Sowerby on 25 Aug., 1917. Alt. 3500 feet.

Range. The range of this form appears to be restricted to the somewhat limited forested mountainous area known as the Tung Ling, formerly a hunting-preserve of the Imperial Manchu family.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

December 15th, 1920.—Mr. R. D. Oldham, F.R.S.,
President, in the Chair.

The following communication was read:—

‘Palæontology of the Tertiary Deposits in North-Western Peru.’ By Henry Woods, M.A., F.R.S., T. Wayland Vaughan, Ph.D., J. A. Cushman, Ph.D., and Prof. Herbert Leader Hawkins, D.Sc., F.G.S.

The fauna of the Negritos Formation is of shallow-water character, and consists mainly of gasteropods and lamellibranchs,